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Patent Claims

1. Data live streaming system comprising at least one data live streaming broadcaster (LSB) and at least two live streaming recipients (LSR),

5   said at least two live streaming recipients (LSR) forming at least a part of a peer-to-peer streaming network and

said at least two live streaming recipients (LSR) each comprising means for generation of peer-to peer streaming to other live streaming recipients (LSR) of said

10   peer-to peer streaming network and wherein said peer-to peer streaming to other streaming recipients (LSR) comprises loss resilient code representations of data from said at least one live streaming broadcaster (LSB).

2. Data live streaming system according to claim 1, wherein each of said at least two

15   live streaming recipients (LSR) provides at least one unique partial encoded representation (UPR) of Input Data (I) by means of said means for generation of peer-to peer streaming to other streaming recipients.

3. Data live streaming system according to claim 1 or 2, wherein at least two of said

20   unique partial encoded representations (UPR) form a complete representation of data.

4. Data live streaming system according to any of the claims 1-3, wherein said means for generation of peer-to peer streaming to other streaming recipients substantially provides M unique partial encoded representations (UPR) of Input Data (I) and

25   wherein the streamed data from the live streaming broadcaster (LSB) is fully or substantially represented by a subset of N unique partial encoded representations (UPR).

5. Data live streaming system according to any of the claims 1-4, wherein the

30   number M substantially corresponds to the number of live streaming recipients (LSR).

6. Data live streaming system according to any of the claims 1-5, wherein the streamed data from the at least one live streaming broadcaster (LSB) is fully represented by a subset of N unique partial encoded representations (UPR) encoded by Reed-Solomon based loss resilient code segments.

7. Data live streaming system according to any of the claims 1-6, wherein the streamed data from the live streaming broadcaster (LSB) is substantially represented by a subset of N unique partial encoded representations (UPR) encoded by LT-based based loss resilient code segments.

8. Data live streaming system according to any of the claims 1-7, wherein at least one of said at least two live streaming recipients (LSR) may regenerate the encoded data from said live streaming broadcaster (LSB) by decoding a number N unique partial encoded representations (UPR) of data and wherein at least one, preferably at least ten of said N unique partial encoded representations (UPR), is generated by other live streaming recipients (LSR).

9. Data live streaming system according to any of the claims 1-8, wherein said loss resilient code representations of data are provided in frames.

10. Data live streaming system according to any of the claims 1-9, wherein said frames comprise time frames substantially produced and transmitted sequentially by said live streaming broadcaster (LSB).

11. Data live streaming system according to any of the claims 1-10, wherein the streaming of data to said at least one live streaming broadcaster (LSB) is structured in consecutive frames and wherein substantially each frame is initiated by an initial transmission of data representation to said at least two live streaming recipients (LSR) and wherein said at least two live streaming recipients (LSR) stream said data representations or derivatives thereof to other live streaming recipients (LSR) as loss resilient code segments and wherein recipients gather a number N of unique loss

resilient code segments and regenerates said frame transmitted from said at least one live streaming broadcaster (LSB) as a live streaming signal.

12. Data live streaming system according to any of the claims 1-11, wherein said peer-to peer comprises a grid based system.

13. Data live streaming system according to any of the claims 1-12, wherein said data comprises video and/or audio streams.

14. A network comprising

        at least one Input Data (I) broadcaster (IB) and

        a plurality of peers (P)

said plurality of peers (P) transforming Input representative data (IRD) from said at least one Input broadcaster (IB) into a plurality of M unique partial encoded representations (UPR) of Input Data (I),

and wherein a plurality of code subsets (W1, W2, W3,..) of said M unique partial encoded representations comprises N different unique partial encoded representations (UPR) of said Input Data (I), each subset (W1, W2, W3,..) representing said Input Data I and where N is less than M-1.

15. Network according to claim 14, wherein each of said input peers produces one of said M unique partial encoded representations (UPR) of Input Data (I).

16. Network according to claim 14 or 15, wherein at least one, preferably all of said code subsets (W1, W2, W3..) represents an encoded version of said Input Data (I).

17. Network according to any of the claims 14-16, wherein at least one of said code subsets (W1, W2, W3..) is encoded by means of LT based codes.

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18. Network according to any of the claims 14-17, wherein at least one of said code subsets (W1, W2, W3..) is encoded by means of Reed-Solomon based codes.

19. Network according to any of the claims 14-18, wherein said network comprises
5   at least two recipient peers (RP), which may gather at least one of said subsets (W1, W2, W3..) and decode the at least one of said subsets (W1, W2, W3..) into data corresponding to the encoded data.

20. Network according to any of the claims 14-19, wherein the gathering performed
10   by said at least two recipient peers (RP) is performed on the basis of a request to at least one of the other peers, preferably a plurality of peers.

21. Network according to any of the claims 14-20, wherein the gathering performed by said at least two recipient peers (RP) is performed on the basis of a push
15   transmission performed by at least one of the other peers, preferably a plurality of peers.

22. Network according to any of the claims 14-21, wherein at least one of said peers (P) forms a recipient peer (RP).
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23. Network according to any of the claims 14-22, wherein said input representative data (IRD) is established at least partly by at least two intermediate peers (IP).

24. Network according to any of the claims 14-23, wherein said intermediate peers
25   (IP) comprise further intermediate processing steps adapted for establishment of input representative data (IRD).

25. Network according to any of the claims 14-24, wherein at least one of said peers (P) forms an intermediate peer (IP).
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26. Network according to any of the claims 1-25, wherein the total number of peers (P) is greater than 5, preferably greater than 50 and even more preferably greater than

200, and the number of intermediate peers (IP) is between 1/5 and 1/100 of the total number of peers and preferably between 1/25 and 1/50 of the total number of peers.

27. Network according to any of the claims 14-26, wherein said input representative data (IRD) is transmitted from said broadcaster (IB) to at least two intermediate peers (IP), preferably at least four intermediate peers (IP).

28. Network according to any of the claims 14-27, wherein said at least two intermediate peers (IP) receive a partial representation of said Input Data (I) only.

29. Network according to any of the claims 14-28, wherein the unique partial encoded representations (UPR) are generated by a plurality of different peers.

30. Network according to any of the claims 14-29, wherein the uniqueness of the unique partial encoded representations (UPR) are ensured by producing the partial encoded representations (UPR) by different peers.

31. Network according to any of the claims 14-30, wherein at least one peer (P) collects and transforms input representative data (IRD) into at least one unique partial encoded representation by a pull process.

32. Network according to any of the claims 14-31, wherein at least one peer (P) collects and transforms input representative data (IRD) into at least one unique partial encoded representation by a push process.

33. Network according to any of the claims 14-32, wherein said Input Data is transmitted from the at least one Input Data broadcaster (IB) on a real-time basis.

34. Network according to any of the claims 14-33, wherein said Input Data (I) is transmitted from the at least one input broadcaster (IB) on a real-time basis in frames.

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35. Network according to any of the claims 14-34, wherein said network is a video streaming network.

36. Network according to any of the claims 14-35, wherein said network is performing video-streaming on demand.

37. Network according to any of the claims 14-36, wherein said network is performing live-video streaming.

38. Network according to any of the claims 14-37, wherein said network is formed by the Internet and said peers (P) comprise computers communicating with the Internet.

39. Network according to any of the claims 14-38, wherein at least one of said peers comprises a computer transforming input representative data (IRD) into at least one unique partial encoded representation (UPR) of Input Data (I) without gathering and/or utilizing partial encoded representation (UPR) of Input Data (I) produced by other peers.

40. Network according to any of the claims 14-39, wherein at least one of said peers may switch between
-at least one mode, where the peer both produces at least one partial encoded representation (UPR) and gathers partial encoded representations produced by other peers to obtain at least one code subset (W1, W2, W3,) and decodes the at least one code subset (W1, W2, W3,), and
-at least one idle mode where the peer acts solely or primarily as a producer of at least one partial encoded representation (UPR).

41. Network according to any of the claims 14-40, wherein the peers are implicitly or explicitly defined in the input data (I).

42. Network according to any of the claims 14-41, wherein the encoded input data (I) is associated to peer defining data.

43. Network according to any of the claims 14-42, wherein said unique partial encoded representations (UPR) comprise loss resilient codes.

44. Network according to any of the claims 14-43, wherein said Input Data comprises video streaming,

said broadcaster (IB) comprises a video streaming broadcaster and

at least two of said plurality of peers (P) comprise recipients of video streams.

45. Method of streaming data in a live streaming system according to any of the claims 1-13 comprising at least one data live streaming broadcaster (LSB) and at least two live streaming recipients (LSR),

said at least two live streaming recipients (LSR) forming at least a part of a peer-to-peer streaming network and

said at least two live streaming recipients (LSR) each comprising means for generation of peer-to peer streaming to other live streaming recipients (LSR) of said peer-to peer streaming network and wherein said peer-to peer streaming to other streaming recipients (LSR) is established by means of loss resilient code representations of data from said at least one live streaming broadcaster (LSB).

46. Method of distributing input data (I) in a network according to any of the claims 14-44 comprising

at least one Input Data broadcaster (IB) and

   a plurality of peers (P)

whereby said plurality of peers (P) transforms Input representative data (IRD) from said at least one Input broadcaster (IB) into a plurality of M unique partial encoded representations (UPR) of Input Data (I),

and wherein a plurality of code subsets (W1, W2, W3,..) of said M unique partial encoded representations comprises N different unique partial encoded representations (UPR) of said Input Data (I), each subset (W1, W2, W3,..) representing said Input Data I and where N is less than M-1.

47. Use of loss resilient codes in a data live streaming system according to any of the claims 1-13.

48. Use of loss resilient codes in a network according to any of the claims 14-44.